

We Claim

1. An all-optical data compression system comprising:
  - a) an input encoding unit having at least one input for receiving a data channel;
  - b) an output decoding unit having at least one output for providing a data channel;
  - c) a radiation guide for carrying encoded optical data signals from said encoding unit to said decoding unit, and
  - d) said encoded optical data signals are in a form of a train of optical pulses equally separated by a time interval and having relative phase shifts between adjacent pulses.
2. The system of claim 1 wherein said phase shifts are in the range between 0 and integral number of  $2\pi$  radians.
3. The system of claim 1 wherein said decoding unit includes an array of summing gates having first and second inputs.
4. The system of claim 3 wherein said summing gates connected to a dividing device.
5. The system of claim 3 wherein said first and second inputs of said summing gates produce a relative time delay that is equal to said time interval.
6. The system of claim 4 wherein said first and second inputs of said summing gates produce relative phase shifts that are equal to said relative phase shifts.
7. The system of claim 1 wherein said one output of said decoding unit produces multiple levels signals.

8. The system of claim 1 wherein said one output of said decoding unit produces the highest level of said multiple levels signal when the relative phase shift between the first and the second inputs of a summing gate of said decoding unit is equal to one of said relative phase shifts. .
9. The system of claim 1 wherein said time interval is equal to integral number of time slots of said encoded optical data signal.
10. The system of claim 7 wherein said phase shifts selected to produce said multiple levels signal that their amplitudes are equally spaced.
11. The system of claim 1 wherein said one output of said decoding unit includes threshold mechanism.
12. The system of claim 8 wherein said threshold mechanism includes electronic threshold.
13. The system of claim 8 wherein said threshold mechanism includes optical threshold
14. The system of claim 1 wherein said decoding unit is a demultiplexing unit.
15. The system of claim 1 wherein said encoding unit includes multiple inputs and said decoding units includes multiple outputs.
16. The system of claim 1 wherein said encoding unit includes one input and said decoding units includes one output.
17. The system of claim 1 wherein said encoding unit receives multiple data channels by multiple said inputs and encodes said data channels into single said encoded optical data signals.

18. The system of claim 12 wherein said each of said data channels received by one of said multiple inputs emitted by one of said outputs of said decoding unit.
19. The system of claim 1 wherein said encoding unit receives single data channel by said one inputs and encodes said data channels into single said encoded optical data signals.
20. The system of claim 16 wherein said the number of time slots reserved for the pulses in said encoded optical data signal is smaller than the number of time slots reserved for said data channel.